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# Commentary: The social transition of cardiovascular disease in low- and middle-income countries: wait and see is not an option

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A critical question for public health is whether, in low- and middle-income countries (LMIC), the increasing burden of cardiovascular disease (CVD) concentrates more on the advantaged or on the disadvantaged sections of society, and how this social patterning of CVD changes over time. Subramanian and colleagues argue that CVD concentrates on the rich in India, with limited evidence for the occurrence of a shift towards the poor.<sup>1</sup>

Operationally, the social patterning of CVD in LMICs can be usefully framed along two different perspectives: (i) what is the current social patterning of CVD based on reliable population-based epidemiological data, acknowledging that few data are available in LMICs; and (ii) what is the potential relevance of different scenarios of social patterning of CVD on policy development, considering that definite data are not yet available in many LMICs but some tools can help anticipate future trends (i.e. findings in high-income countries, theory of the health transition, social theory about adoption of lifestyles, etc.). Subramanian and colleagues mainly adopt the first perspective (i.e. current factual evidence in India), although they also attempt to draw some conclusions on policy. They reviewed mainly cross-sectional

studies covering a fairly large time lapse (1969 to 2008), but there is little attempt to examine changes in the social patterning of CVD/CVD risk factors during this period. A clearer view on the social transition of CVD and related risk factors could have perhaps emerged if they had restricted their review to those studies using longitudinal data or repeated cross-sectional surveys on the same population; or by attempting to compare studies from different time periods.

It seems to us that substantial evidence supports the view that the socioeconomic gradient in CVD and CVD risk factors is reversing from the rich to the poor in those LMICs which are at an intermediate stage of the health transition, and that such a shift is likely to occur in those LMICs at an early stage of the health transition (in which the burden of CVD still concentrates among the rich). This frame is important as it provides a rationale for tackling CVD among the poor at an early stage of the non-communicable disease (NCD) epidemics. Here a crucial question arises: who are the poor? Referring to a study of Pednekar *et al.*, Subramanian and colleagues report that age-adjusted CVD mortality in Mumbai was 654, 618, 518 and 450 (per 100 000) among men

with, respectively, primary, middle, secondary and tertiary education. Subramanian and colleagues reject the interpretation that there is a negative association between educational level and CVD because the CVD mortality rate among the illiterates was 471 (per 100 000), which was higher than that of highly educated persons, yet lower than that of people with primary or intermediate education. It seems to us that this result on the contrary clearly shows a negative socioeconomic gradient in CVD mortality among the literates.

It is unquestionable that the most socioeconomically deprived individuals, who cannot meet the minimum dietary energy requirement or indulge in unhealthy behaviours associated with globalization, are inherently less affected by obesity, diabetes, dyslipidaemia and hypertension. This is true in India as in most LMICs. However, we believe that the main issue, from a global public health perspective, is whether socioeconomic development (which inexorably extends to larger segments of the population worldwide) drives a shift in the social patterning of CVD and its risk factors towards the poor, and whether this unfavourable trend could be mitigated by some interventions. For example, the prevalence of tobacco use, the largest avoidable risk factor for NCDs, is already consistently greater among the poor in most LMICs (including India).<sup>2,3</sup>

We recently examined changes in the social patterning of CVD risk factors in the Republic of Seychelles (a middle-income island state in the Indian Ocean), based on serial cross-sectional surveys carried out between 1989 and 2004.<sup>4</sup> Among men, current smoking and heavy drinking were more prevalent in the lower vs the higher socioeconomic groups throughout the study period, but obesity was less prevalent. The socioeconomic gradient in diabetes reversed over the study period, with high prevalence shifting from individuals with high socioeconomic status (SES) to individuals with low SES. Hypercholesterolaemia was less prevalent in the low vs the high SES groups in 1989, but the prevalence was similar in the two groups in 2004. Similar changes were also observed in women, where in addition a reversal in the SES gradient in smoking was noted. These changes in the social patterning of CVD risk factors over time paralleled considerable socioeconomic development (the national gross domestic product per capita rose from US\$600 in 1976 to US\$8000 in 2004) and marked changes in dietary patterns and physical activity levels in the population.<sup>5</sup> Results in Seychelles are consistent with data in China,<sup>6</sup> Brazil,<sup>7</sup> seven countries in Africa<sup>8</sup> and 39 LMICs;<sup>9</sup> these findings support the view that CVD risk factors do shift towards the poor in LMICs along with economic development, globalization, urbanization and the nutritional transition.

We understand the concern of Subramanian and colleagues that shifting attention from communicable to non-communicable diseases in countries such as

India, where the majority of the population still lives on less than US\$2 a day, might divert some resources from the very poor to the less poor. However, it is likely that interventions to prevent the increasing burden of CVD and other NCDs among the poor will be more successful if implemented early enough in the health transition and before the reversal of the social patterning of CVD is fully engaged. Furthermore, and most importantly, there is now a unique window of opportunity to curb the emergence of CVD and other NCDs in LMICs at the global level. The importance of addressing NCDs in LMICs and the need to focus on the poor are well recognized in recent evidence-based global health policy documents such as the political declaration of the High-level Meeting on the Prevention and Control of Non Communicable Diseases of the General Assembly of the United Nations ([http://www.un.org/ga/search/view\\_doc.asp?symbol=A/66/L.1](http://www.un.org/ga/search/view_doc.asp?symbol=A/66/L.1)) or the World Health Organization global action plan for the prevention and control of NCDs 2013–2020, to be submitted to the World Health Assembly in May 2013.

We believe that addressing NCDs in LMICs by implementing cost-effective structural interventions to tackle avoidable NCDs at both the population and individual levels, including universal coverage for carefully selected priority management approaches among high risk individuals, is timely, justified and necessary.<sup>10–12</sup> The close links between several communicable and non-communicable diseases (i.e. HIV, tuberculosis and NCDs), the possibility of integrating treatment for both groups of diseases at the primary care level, the strong impact of chronic diseases on catastrophic expenditure and impoverishment, and the need to address NCDs as part of the broader development agenda further support this view.<sup>13</sup>

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# Commentary: Poverty and cardiovascular disease in India: Do we need more evidence for action?

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It appears that some Western academics are still caught in a time warp, like Rip van Winkle. An argument was advanced by a World Bank team in 1999, that any action to control non-communicable diseases (NCDs) would only help the rich and hurt the global poor by increasing health inequity.<sup>1</sup> This has subsequently been refuted by many.<sup>2,3</sup> Even the World Bank changed its stance in 2007, declaring that in 'all countries and by any metric, NCDs account for a large enough share of the disease burden of the poor to merit serious policy response'.<sup>4</sup> The United Nations political resolution on NCDs, in September 2011, also acknowledged that NCDs are imposing health and developmental burdens on the

poor in low- and low-middle income countries.<sup>5</sup> Despite this, Subramanian *et al.* have chosen to rehash the same argument with regard to cardiovascular disease (CVD) in India.<sup>6</sup> In brief, they reviewed the available published literature from India on the association between socio-economic status (SES) and cardiovascular (CV) risk factors or acute events or mortality outcome. They demonstrated a positive gradient in socio-economic status (SES) in the prevalence of one of the CV risk factors, obesity or overweight in Indians, and postulated that CVD is a concern for only the rich in India. In effect their stated position was similar to the Gwatkin thesis and it is disheartening that we have not moved